

ABSTRACT OF THE DISCLOSURE

Methods and devices for detecting the interaction of single molecules with surface-bound reagents are disclosed. The methods utilize synchronized techniques for controlling the interaction between labeled molecules in a flowing solution with reagents supported on a surface, and incorporate optical detection techniques such as fluorescence measurements. One application of the disclosed methods and devices is the detection of chemical reactions in which the nucleobases of labeled NTP molecules become incorporated into the DNA of a surface-bound enzyme-DNA complex with release of the labels.